

热能工程

旋流式气液同轴式喷油器在加压空间中雾化特性的试验研究

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摘要:

在增压条件下对一种旋流式气液同轴喷油器的雾化特性进行研究。在不同的环境背压条件下, 采用PDPA测量距离喷口处70mm的液雾分布, 研究了环境背压、气液相对速度、以及燃油流速对索特平均直径(Sauter mean diameter, SMD)的影响规律。结果表明: 当保证燃油流速一定、气液相对速度一定的条件下, SMD随环境背压的增大而减小; 当环境背压及燃油流速一定的条件下, SMD随气液相对速度的增大而减小; 当保证雾化空气压力以及环境背压一定的条件下, 燃油流速对SMD的影响规律存在一个拐点, 随着燃油流速的增加, SMD先增加后减小, 在文中的试验条件下, 燃油流速拐点值约为9.91m/s。根据试验数据整理出SMD与环境背压、气液相对速度及燃油流速的拟合公式。

关键词: 气液同轴喷油器 加压空间 索特平均直径 雾化特性

Experimental Study on Atomization Characteristics of Gas/Liquid Coaxial Swirling Nozzle in Pressurized Space

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Abstract:

The atomization characteristics of a gas/liquid coaxial swirling nozzle in pressurized space were investigated. Under different background pressures, the Sauter mean diameter (SMD) affected by the background pressure, the relative velocity of atomization gas to oil and the oil velocity were studied through measuring the size distribution of the droplets with 70 mm to the exit orifice by Phase Doppler Particle analyzer(PDPA). The results show that when the relative velocity of atomization air to oil and oil velocity are fixed, SMD decreases as the background pressure increases; when the background pressure and oil velocity are fixed, SMD decreases as the relative velocity of atomization air to oil increases; under the condition of fixed atomization air pressure and background pressure, the affection rule of the oil velocity on the SMD has an inflexion. SMD increases firstly and decreases lately as oil velocity rises. Based on the experiments, the inflexion value is 9.91 m/s. Correlations between SMD and background pressure, relative velocity of atomization air to oil and oil velocity were analyzed according to the examination data.

Keywords: gas/liquid coaxial swirling nozzle pressurized space Sauter mean diameter (SMD) atomization characteristics

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